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covered consisted wholly of electric charges was sustained by many people, and was clinched by the experiments of Kaufmann in 1902.

4. The concentration of the ionic charge, required to give the observed corpuscular inertia, can be easily calculated; and consequently the size of the electric nucleus, or electron, is known.

5. The old perception that a magnetic field is kinetic has been developed by Kelvin, Heaviside, FitzGerald, Hicks and Larmor, most of whom have treated it as a flow along magnetic lines; though it may also, perhaps equally well, be regarded as a flow perpendicular to them and along the Poynting vector. The former doctrine is sustained by Larmor, as in accordance with the principle of least action, and with the absolutely stationary character of the ether as a whole; the latter view appears to be more consistent with the theories of J. J. Thomson.

6. A charge in motion is well known to be surrounded by a magnetic field; and the energy of the motion can be expressed in terms of the energy of this concomitant field—which again must be accounted as the kinetic energy of ethereal flow.

7. Putting these things together, and considering the ether as essentially incompressible—on the strength of the Cavendish electric experiment, the facts of gravitation, and the general idea of a connecting continuous medium—the author reckons that to deal with the ether dynamically it must be treated as having a density of the order  $10^{12}$  grams per cubic centimeter.

8. The existence of transverse waves in the interior of a fluid can only be explained on gyrostatic principles, *i. e.*, by the kinetic or rotational elasticity of Lord Kelvin. And the internal circulatory speed of the intrinsic motion of such a fluid must be comparable with the velocity with which such waves are transmitted.

9. Putting these things together, it follows that the intrinsic or constitutional vortex energy of the ether must be of the order  $10^{33}$  ergs per cubic centimeter.

*Conclusion.*—Thus every cubic millimeter of the universal ether of space must possess the equivalent of a thousand tons, and every part of it must be squirming internally with the velocity of light.

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#### THE AMERICAN ELECTROCHEMICAL SOCIETY

THE twelfth general meeting of the American Electrochemical Society will be held in New York City on October 17, 18 and 19 (Thursday, Friday and Saturday of the third week of October).

The meeting will be opened by an evening session on Thursday, October 17. This session as well as the morning session on Friday, October 18, will be held at the Chemists' Club, 108 West 55th Street. The morning session of October 19 will be held in Havemeyer Hall, Columbia University. Headquarters for registering and information are at the Chemists' Club. Hotel headquarters are at the Hotel Cumberland, 54th Street and Broadway.

On Friday afternoon an excursion will be made to the laboratories of Mr. Thomas A. Edison. Mr. Edison will receive the visitors personally. A special car will be provided on the Delaware, Lackawanna & Western Railroad, the train leaving West 23d Street at 2:15. On the evening of Friday a subscription dinner will be held in Liederkranz Hall. Ladies are specially invited.

On Saturday afternoon an excursion will be made to the new Pennsylvania Railroad power plant at Long Island City, the New York Electrical Testing Laboratories and other points or places of interest to be announced at the meeting. On the evening of Saturday a smoker will be tendered to the American Electrochemical Society by the Chemists' Club.

During the meetings there will be an exhibition of some novelties of electrochemical products and apparatus at the Chemists' Club.

The program of papers is as follows:

##### *Thursday Evening*

- 8 P.M.—Reception and session at Chemists' Club.  
8:40 P.M.—Illustrated lecture on "Diamond and

Moissanite: Natural, Artificial and Meteoric," by Dr. Geo. F. Kunz.

9:30 P.M.—Lecture on "Deflocculated Graphite," by Mr. E. G. Acheson, of Niagara Falls, with demonstrations and experiments.

#### *Friday Morning Session*

9 A.M.—At Chemists' Club.

"On the Electrothermic Reduction of Iron Ores," by Messrs. Albert E. Greene and Frank S. MacGregor.

"Discussion of the Electric-Furnace Experiments for the Production of Pig Iron at Sault Ste. Marie," by Dr. Joseph W. Richards.

"Electric-Furnace Experiments," by Dr. H. N. Potter.

"Discussion of Moissan's Experiments on the Boiling Points of the Metals," by Dr. O. P. Watts.

"The Electrometallurgy of Zinc," by M. Gustave Gin.

"A New Application of Chlorine in Metallurgy," by Mr. C. E. Baker.

"The Heat Conductivity of Carbon," by Mr. F. A. J. Fitzgerald.

"Granular Carbon Resistors," by Professor S. A. Tucker.

#### *Saturday Morning Session*

9 A.M.—At Columbia University.

"Physico-chemical Notes on the Aluminates of Soda," by Mr. P. B. Sadtler.

"Action of Ammonium Persulphates on Metals," by Mr. J. W. Turrentine.

"Note on the Use of the Capillary Electrometer for Alternating Voltages," by Mr. M. G. Floyd.

"Electroscopic Determination of Radium in some Tufa at Hot Springs, Arkansas," by Dr. Herman Schlundt.

"Electrolytic Separation of Silver and Copper," by Mr. H. W. Gillett.

"Electrolytic Determination of Minute Quantities of Copper," by Mr. E. E. Free.

"Electrolytic Reduction of Nitric Acid," by Dr. H. E. Patten and Robinson.

"Electrochemical Methods for the Qualitative and Quantitative Determination of Free Silicon in the Presence of Silica, Silicates, Oxides, Free Carbon and Carborundum," by Mr. W. R. Mott.

"On the Nature of Electrolytic Conductors," by Dr. L. Kahlenberg.

"The Electrolytic Theory of the Corrosion of Iron," by Dr. A. S. Cushman. (Lecture with demonstrations.)

Professor S. A. Tucker, Columbia University, is chairman of the New York Committee. Mr. Alois von Isakovics, Monticello, N. Y., is the local secretary.

#### *SCIENTIFIC NOTES AND NEWS*

A COMMITTEE has been formed in Germany, with the Prussian minister of state as chairman, to found an institution in honor of Dr. Robert Koch. It is intended that the institution shall be devoted to research into the means of checking the diffusion of tuberculosis and that it shall be a permanent memorial of the discovery of the tubercle bacillus by Professor Koch twenty-five years ago. Appeal is made for contributions sufficient to make the institution a tribute of gratitude to Koch, similar to those with which the name of Pasteur has been honored in France and that of Lister in England.

SIR ARCHIBALD GEIKIE, as president of the Geological Society of London, welcomed the members and delegates to the centenary celebrations on the morning of September 26, and in the afternoon gave an address on the state of geology at the time when the Geological Society was founded.

DEAN M. E. COOLEY, of the engineering department of the University of Michigan, has been appointed by the Interstate Commerce Commission to act as chairman of a committee which will meet in Washington to consider devices for the automatic control of trains.

AT the forty-fourth annual meeting of the American Veterinary Medical Association, recently held in Kansas City, Mo., Dr. W. H. Dalrymple, M.R.C.V.S., Louisiana State University, Baton Rouge, was elected president for the ensuing year.

PROFESSOR THEODORE W. RICHARDS, having returned from Germany, has been reappointed chairman of the division of chemistry in Harvard University. During his absence the chairmanship was held by Professor C. Loring Jackson.

PROFESSOR T. A. JAGGAR, of the Massachusetts Institute of Technology, has returned to